ABSTRACT

A method of fabricating a semiconductor device, such as a high electron mobility transistor, a vertical cavity surface emitting laser, an edge emitting laser, a heterostructure bipolar transistor, a resonant tunneling diode, and the like, is disclosed that includes the steps of depositing a plurality of layers of semiconductor material including at least one active area with opposed major surfaces and a cladding layer adjacent each opposed major surface. In the disclosure, the semiconductor material is in an aluminum/gallium arsenide semiconductor system. At least one of the active area and the cladding layers are deposited at relatively low temperatures in the presence of a surfactant, such as antimony, indium, bismuth or thallium to produce greatly improved carrier mobility and surface morphology.